

# 1- or 2-Channel Circular Recorder/Controllers

CT8100



**305 mm (12") Chart  
1- or 2-Pen Versions  
Programmable Inputs:  
Thermocouple, RTD,  
DC Current or Voltage  
Control Outputs  
4-Digit, 14 mm (0.56") High  
Display per Pen**

The CT8000 Series circular chart recorder/controllers measure, display, and control up to 2 process variables. Choose from a variety of programmable inputs. All recorder, control, and alarm functions are easily configured via the front keypad. The user can choose 1 of 2 alarm settings for each pen. RS485 communications and NEMA 4X (IP66) are also available. Control outputs include SSR driver, 4 to 20 mA, and relays. With the 4 to 20 mA option, the user can retransmit the process value.

## Specifications

### Inputs

#### Input Types/Range:

**Thermocouple:** J, K, T, R, S, E, B, N, C

**RTD:** 100  $\Omega$  Platinum, 0.00385  $\Omega/\Omega/^\circ\text{C}$

**DC Current:** 0 to 20 mA, 4 to 20 mA. external shunt resistor, 2.5  $\Omega$  or 250  $\Omega$  (not included)

**DC Voltage:** 0 to 25 mV, 0 to 50 mV, 10 to 50 mV, 0 to 5 V, 1 to 5 V

**Impedance:** > 100 M $\Omega$  for T/C and mV inputs; 100 k $\Omega$  for 5 V inputs; 2.5  $\Omega$  or 250  $\Omega$  for mA inputs

#### RTD Excitation Current:

330  $\mu\text{A}$ , typical

**Input Scan Rate:** 1 scan per second

#### Input Correction:

Offset adjustment -999 to 999 units

**Remote Setpoint:** 0 to 5 V, 1 to 5 V

#### Sensor Fault Detection:

Sensor break on all T/Cs, RTDs, 1 V, 1 to 5 V, 4 to 20 mA, and millivolt inputs. No sensor break can be detected for zero-based volt and milliamp ranges. Display goes to "SnSr" and pen goes up-scale if a sensor break is detected. Display goes to "Hi" 5% above span; display goes to "Lo" 5% below scan.

#### Transmitter Power Supplies:

One isolated 50 mA @ 24 Vdc supply available



*OMEGACARE<sup>SM</sup> extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE<sup>SM</sup> covers parts, labor and equivalent loaners.*

**CT8110 shown smaller than actual size.**



## Input Performance

### Performance Under Reference Conditions:

#### Measurement Error:

**Type J, K, T, E, N, C T/Cs and RTDs:**

$\pm 0.25\%$  of span  $\pm 1$  degree.

**Type R, S, B, C T/Cs:**  $\pm 0.25\%$  of span @ 25 $^\circ\text{C}$  (77 $^\circ\text{F}$ ) mVdc and Vdc;  $\pm 0.25\%$  of scaled span plus 1 least-significant digit

#### Cold-Junction

#### Compensation Error:

$\pm 0.2^\circ\text{C}$  (0.36 $^\circ\text{F}$ ) @ 25 $^\circ\text{C}$  (77 $^\circ\text{F}$ )

#### Cold-Junction

#### Compensation Rejection:

0.04 $^\circ\text{C}$  (0.07 $^\circ\text{F}$ ) deviation from 25 $^\circ\text{C}$  (77 $^\circ\text{F}$ )

#### Linearization Error:

**T/Cs:**  $\pm 0.25^\circ\text{C}$  (0.45 $^\circ\text{F}$ ) typical,  $\pm 0.5^\circ\text{C}$  (0.9 $^\circ\text{F}$ ) worst case

**RTDs:**  $\pm 0.1^\circ\text{C}$  (0.18 $^\circ\text{F}$ ) typical,  $\pm 0.3^\circ\text{C}$  (0.54 $^\circ\text{F}$ ) worst case

#### Ambient Temperature Error:

$\pm 0.01\%$  of span per  $^\circ\text{C}$  (1.8 $^\circ\text{F}$ ) deviation from 25 $^\circ\text{C}$  (77 $^\circ\text{F}$ )

#### Common-Mode Rejection:

90 dB minimum; 24 Vac maximum for RTD input; 115 Vac maximum all others

#### Normal-Mode Rejection:

85 dB minimum @ 60 Hz or greater

#### Isolation:

RTD inputs 24 Vac; all other inputs 115 Vac; inputs share a common signal ground

#### Reference Conditions

**Ambient Temperature:** 25 $^\circ\text{C}$  (77 $^\circ\text{F}$ )

**Relative Humidity:** 60 to 70%

## Recording

**Pen Type:** Disposable fiber tip

**Pen Color:** Pen 1—red; pen 2—green

**Chart Size:** 305 mm (12")

**Chart Drive:** Stepper motor

**Chart Rotation:** User configurable:

0.1 to 999 hours in 0.1-hour increments

**Chart Span:** Bottom and top of span, -9999 to 9999 units

**Filtering:** 1 to 20 scans averaging (affects display and recording)

**Recording Performance**

**Chart Resolution Accuracy:**

0.5% of chart span reference accuracy

**Resolution:** 0.15% of chart span

**Deadband:** 0.3% of chart span

**Response Time:**

20 seconds for full scale travel

**Chart Rotation Accuracy:**

$\pm 0.5\%$  of rotation time, assuming all backlash removed

## Operator Interface

**Display:** 4-digit, 0.56" (14 mm) high, red, 7-segment, LED display

### Resolution:

**T/C and RTD:** 0.1 and 1 $^\circ$

**mV, V and mA:** 0.001, 0.01, 0.1 and 1 unit

### Status Indicators:

**Recorders:** ALRM1 and ALRM2; red LEDs.

**Controllers:** MAN, OUT1, OUT2, ALRM; yellow and red LEDs

**Keypad:** 3 keys for programming and unit operation; 1 or 2 auto/manual keys on controllers

### Display Modes:

**Recorders:** Process value(s)

**Controllers:** Process value(s) or deviation(s), with or without setpoint sequentially

## Alarms

**Number:** Up to 2 process alarms for each of 2 inputs

### Type:

**Recorder:** Process high or low.

**Controllers:** Process, deviation, or band

**Hysteresis:** Fully adjustable,

0 to 300 units, straddles alarm point

**Security:** Alarm setpoint changes can be prohibited

**Sensor Fault Action:** Alarms work normally in "HI" and "LO" conditions; alarm relays are de-energized in a "SnSr" sensor break condition

## ON/OFF Outputs

### On/Off Outputs:

Assignable to alarm or control outputs

**Relays:** SPDT; contacts rated 5 A resistive @ 115 Vac, 2.5 A resistive @ 230 Vac, ½ hp at 230 Vac (single phase), 250 VA @ 115/230 Vac

### Solid State Relay Driver:

Open-collector output; can provide 40 mA at 3 Vdc or 20 mA at 4 Vdc; short circuit current is limited to 100 mA

### Current Output

**Drivers:** Assignable to process value or setpoint retransmission or control outputs

### Output Span:

0 to 20 mA or 4 to 20 mA, nominal

**Resolution:** 0.02% of 20 mA;

12 bits over a 0 to 25.6 mA span

**Accuracy:** ±0.1% to 20 mA

span reference accuracy

**Compliance:** 650 Ω load

### Power Requirements

**Line Voltage:** 115/230 Vac, ±10%,

50/60 Hz (230 Vac is optional)

**Power Consumption:** 25 VA max

### Construction

**Enclosure:** Gasketed cover, case and windows; structural foam case and cover with plastic or glass window area; door lock available

**NEMA Rating:** NEMA 3 (IP54) standard

**Conduit Openings:** 4 openings

standard, 2 additional as required

### Mounting:

Panel or wall, or optional pipe mounting

### Overall Dimensions:

358.65 W x 425.96 H x 196.85 mm D

(14.12 x 16.77 x 7.75")

**Panel Cutout:** 322.58 W x 322.58 mm H

(12.7 x 12.7")

**Panel Depth:** 133.35 mm (5.25")

**Panel Protrusion:** 63.5 mm (2.5")

**Weight:** 9 kg (20 lb) max

## Environmental and Operating Conditions

### Operating Temperature:

0 to 55°C (32 to 131°F)

### Storage Temperature:

-40 to 65°C (-4 to 149°F)

### Humidity:

10 to 90% RH, non-condensing

## Digital Communications

**Communications Port:** RS485 serial

communications, half-duplex

**Bit Rate:** 9600, 4800, 2400,

1200, 600, 300 baud

### Configuration:

**Monitor:** Read only.

**Normal:** Read and write

**Address:** User configurable;

0 to 99 for each pen

## General Reference Data

### Data Backup:

Battery-backed SRAM for all data

### Battery Backup:

5 years minimum life, 10 years typically

## Approvals and Compliance

**Safety:** UL approved for USA: UL 1092, UL 916 and QUXX, pending, UL certified for Canada: CSA Spec 142, pending

## Thermocouple Ranges

Sensor Type	Sensor Specs	Code	Reference Range °C	Reference Range °F
TC	Iron-constantan	J	0 to 760	0 to 1400
	CHROMEGLA®-ALOMEGA®	K	0 to 1360	0 to 2500
	Copper-constantan	T	-200 to 400	-330 to 750
	Platinum 13% rhodium-platinum	R	200 to 1650	400 to 3000
	Platinum 10% rhodium-platinum	S	200 to 1650	400 to 3000
	CHROMEGLA®-constantan	E	0 to 750	0 to 1400
	Platinum 30% rhodium-platinum 6% rhodium	B	200 to 1800	400 to 3300
	OMEGA-P®-OMEGA-N® (nicrosil-nisil)	N	0 to 1300	0 to 2370
	Tungsten 5% rhenium-tungsten 26% rhenium Pt100	C	200 to 2300	390 to 4170
RTD	100 Ω 0.00.385	Pt100	-140 to 400	-220 to 750

## To Order

Model No.	Description
CT8100	1-pen circular recorder
CT8101	1-pen circular recorder with 1 relay
CT8100-MA1	1-pen circular recorder with one 4 to 20 mA output
CT8110	2-pen circular recorder
CT8112	2-pen circular recorder with 2 relays
CT8201	1-pen circular recorder/controller with 1 relay
CT8202	1-pen circular recorder/controller with 2 relays
CT8200-D1	1-pen circular recorder/controller with 1 SSR driver
CT8200-MA1	1-pen circular recorder/controller with one 4 to 20 mA output
CT8222	2-pen circular recorder/controller with 2 relays
CT8220-D2	2-pen circular recorder/controller with 2 SSR drivers
CT8220-MA2	2-pen circular recorder/controller with two 4 to 20 mA outputs

Comes complete with package of charts, 1 pen per channel and operator's manual. For RS485 communications, add suffix "-RST" to model number for an additional cost. For 230 Vac option, add suffix "-230V" to model number for an additional cost. For glass window NEMA 4X, add suffix "-4X" to model number for an additional cost. For transmitter power supply, add "-XPS" to model number for an additional cost.

**Ordering Examples:** CT8100, 1-pen circular recorder, CT8000C-0-100/24, 100 sheets of chart paper. OCW-1, OMEGACARE<sup>SM</sup> extends standard 2-year warranty to a total of 3 years.

CT8112, 2-pen circular recorder with 2 relays.

Remember to Order Extra Paper and Pens!

## Accessories

Model No.	Description
CT7000-GREEN	Green pens, package of 5
CT7000-RED	Red pens, package of 5
CT8000C-0-100/24	Circular paper, 100 quantity 24-hour
CT8000C-0-100/7	Circular paper, 100 quantity 7-day
CT8000C-0-300/24	Circular paper, 100 quantity 24-hour
CT8000C-0-300/7	Circular paper, 100 quantity 7-day
CT8000C-0-800/24	Circular paper, 100 quantity 24-hour
CT8000C-0-1000/24	Circular paper, 100 quantity 24-hour

Other ranges available; consult factory for details.